SANYO

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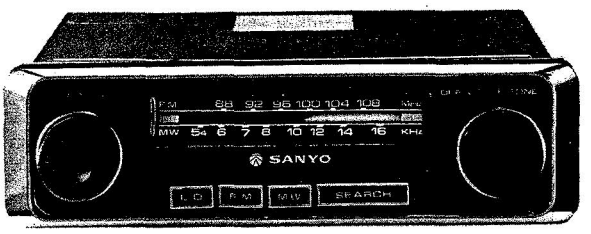
Solid State FM AM Car Radio

Auto-Search Tuning

MODEL F-8605A

SERVICE MANUAL

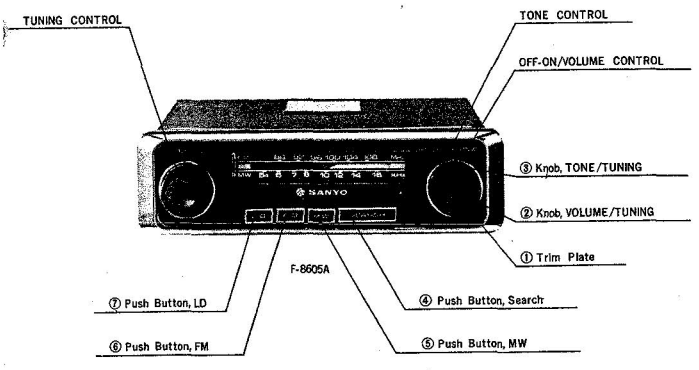
SANYO ELECTRIC CO., LTD.
SANYO ELECTRIC TRADING CO., LTD.
OSAKA, JAPAN



SPECIFICATIONS

Frequency Ranges:	MW 540 – 1605 kHz
	FM 87.5 – 108 MHz
Intermediate Frequency:	MW 455 kHz
	FM 10.7 MHz
Sensitivity:	MW 20 μV (for 500 mW output)
	FM 6 μV (for 500 mW output)
Sensitivity for Signal Seeking:	MW 20 μV
	FM 6 μV
Signal to Noise Ratio:	MW 25 dB (at 56 μV signal input)
	FM 35 dB (at 25 μV signal input)
Selectivity:	MW 20 dB (at 10 kHz off-tuning from 1000 kHz)
Audio Output:	Undistorted 3.5 W
	Maximum 5.0 W
Fidelity:	Average 100 Hz ..... −3 dB −3 dB
	4000 Hz ..... −15 dB −4 dB
	MW FM
Power Source:	DC 12 V, Negative grounded battery
Speaker:	5" Permanent Dynamic Type
	Voice Coil Impedance 4 ohms.

CONSTRUCTION

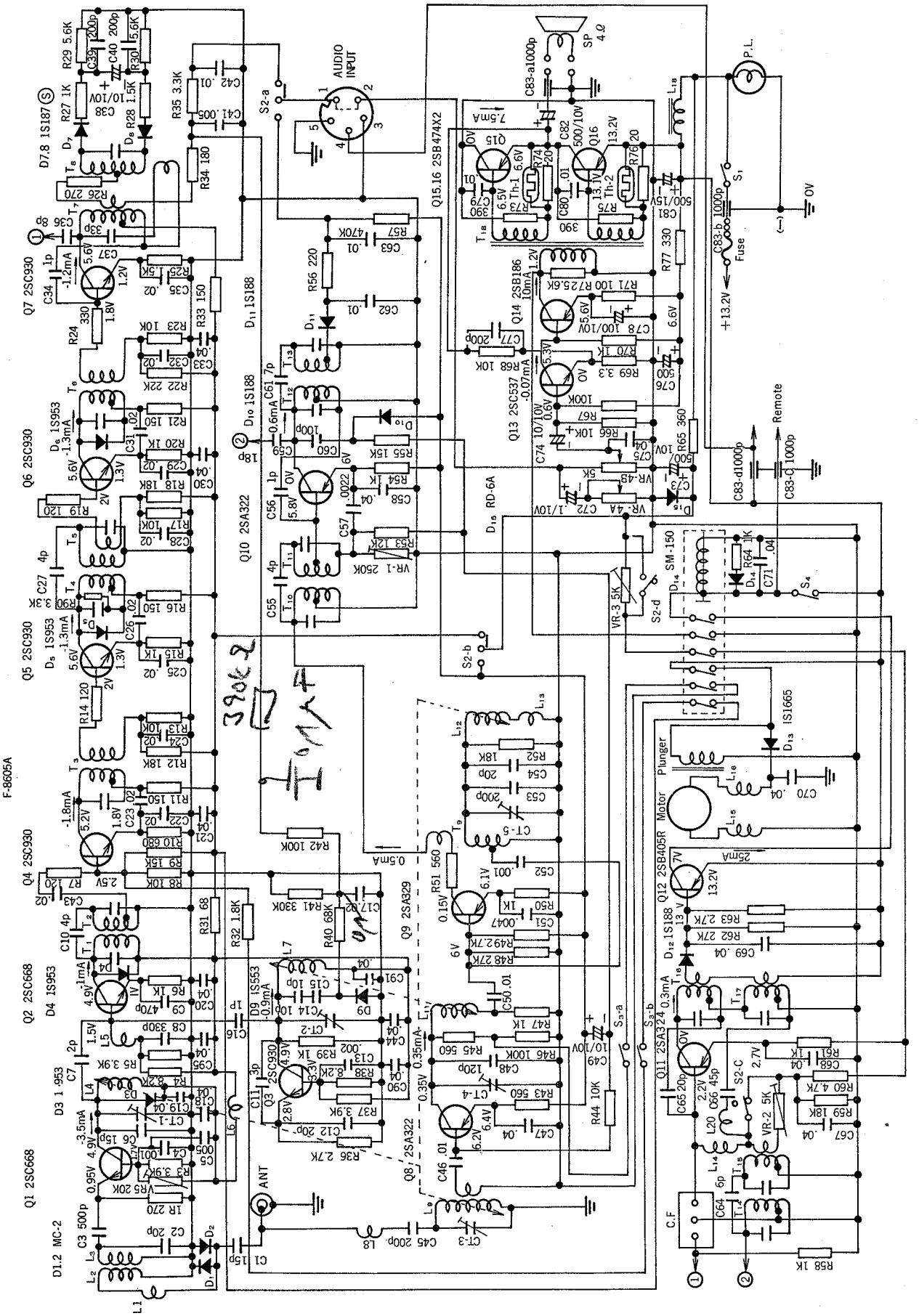


KEY NO.	PARTS NO.	DESCRIPTION	Q'TY
1	R-A397317	Trim Plate, Front Plastic Ass'y	1
2	R-367050	Knob, Soft Plastic, OFF-VOLUME/TUNING	2
3	R-397315	Knob, Hard Plastic, TONE/TUNING CONTROL	2
	R-24950	Hex. Nut, Trim Plate mtg.	2
	R-113232	Washer, Trim Plate mtg.	2
4	R-A397430	Push Button, SEARCH	1
5	R-A267533	Push Button, MW	1
6	R-A267532	Push Button, FM	1
7	R-A267534	Push Button, LO	1
	R-387117	Dial Scale, Plastic	1
	R-267547	Back Ground, Black-painted Metal	1
	R-S87544	Drum Assembly, Dial Indicator	1
	R-S87529	Shaft, Tuning Control	1
	R-127071	Spring, Link between Tuner and Shaft above	1

STANDARD ACCESSORIES

PART NO.	DESCRIPTION	Q'TY
R-32738b	Speaker Box, enclosure only	1
R-S0785	Speaker, 5" 4 ohms	1
AR-2	Remote Search Control Kit	1
R-S1044	Spare Fuse, 1A	1
R-R7006	Resistor, Noise Suppressor	1
R-C4005	Capacitor, Noise Suppressor	1
R-477850	Instruction Book	1
R-117224	Bracket, L type, Speaker Box mtg.	2
R-112809a	Bracket, U type, Speaker Box mtg.	1
	Hex. Hd Screw, 5x16mm, Speaker Box mtg.	2
	Spring Washer, 5φ Speaker Box mtg.	2
	Washer 5φ Speaker Box mtg.	2
	Hex. Hd Screw, 6x30mm, Speaker Box mtg.	2
	Hex. Nut 6φ Speaker Box mtg.	2
	Spring Washer, 6φ Speaker Box mtg.	2
	Washer 6φ Speaker Box mtg.	2
R-11685a	Bracket, Perforated, Radio Rear Support	1
R-111663a	Bracket, L type, Radio Front Support	2
	Hex. Hd Screw, 5x8mm, Radio mtg.	2
	Spring Washer, 5φ Radio mtg.	2
	Washer 5φ Radio mtg.	2

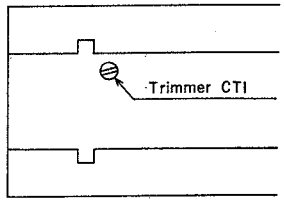
SCHEMATIC DIAGRAM



ALIGNMENT PROCEDURES

ANTENNA TRIMMER ADJUSTMENT
With radio installed in car and antenna fully extended, tune in a weak station near 1400 KHz and adjust CT1 for maximum output.

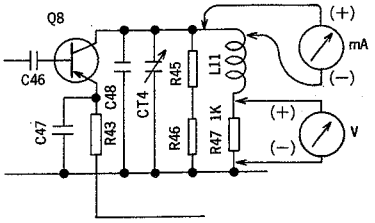
Fig. 1



COLLECTOR CURRENT ADJUSTMENT
With power supply voltage (13.2V) and dummy load (4 ohms) applied, operate the unit without connection of car antenna and set the volume control of the unit at the minimum response.

Turn on the unit and operate it in AM reception.
Insert a miliammeter or connect a voltmeter as shown below and adjust a mini-pot (VRI 250K) for 500 micro-ampere current (or 500 mili-volt voltage) reading provided by a collector current of Q8 (2SA322).

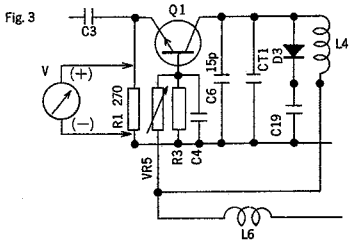
Fig. 2



Turn on the unit and operate it in FM reception.
Connect a voltmeter across Resistor (R1 270 ohms) as shown below and adjust a mini-pot (VR5 20K) for 0.95 volt emitter voltage.

AM ALIGNMENT PROCEDURES
Check power supply voltage (13.2V).
Volume control should be set at maximum response.
Test signal from Modulation frequency 400 Hz
Signal generator: Modulation percentage 30%
Signal level just high enough to provide meter deflection.
Signal supply inlet: Antenna receptacle through the dummy antenna.
Output meter connection: Through extension outlet unless otherwise noted.

Fig. 3



STEP	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	ELEMENTS TO BE ADJUSTED	REMARKS
AM IF ALIGNMENT				
1.	455 KHz	Low frequency end stop	T10, T11, T12 & T13	Adjust for maximum
AM RF ALIGNMENT				
2.	600 KHz	600 KHz	T9	Adjust for maximum output. Repeat steps 2 thru 4.
3.	1400 KHz	1400 KHz	CT-5	
4.	1400 KHz	1400 KHz	CT-3 & CT-4	
AM TRIGGER ALIGNMENT				
5.	1400 KHz	1400 KHz	T17	Shortcircuit a switch between R61 and VR-3. Adjust for minimum current. See Fig. 5 for meter connection.
RELAY				
6.	1400 KHz 27 dB	1400 KHz	VR-2	Adjust for 5 mA current thru relay.

Fig. 4 INSTRUMENT CONNECTION FOR IF & RF TRACKING ALIGNMENT

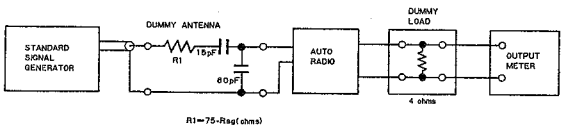
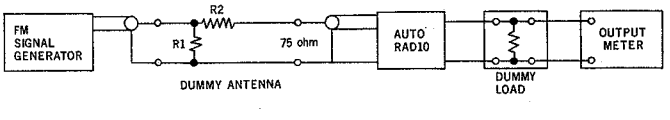


Fig. 6



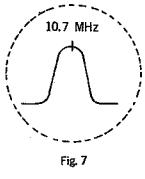


Fig. 7

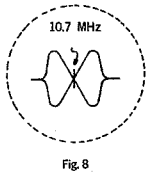


Fig. 8

Fig. 5

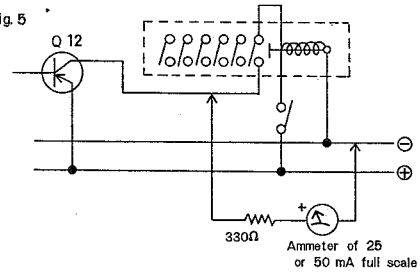
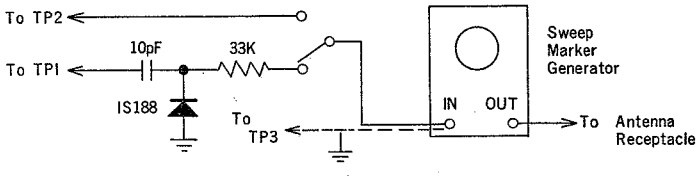


Fig. 9



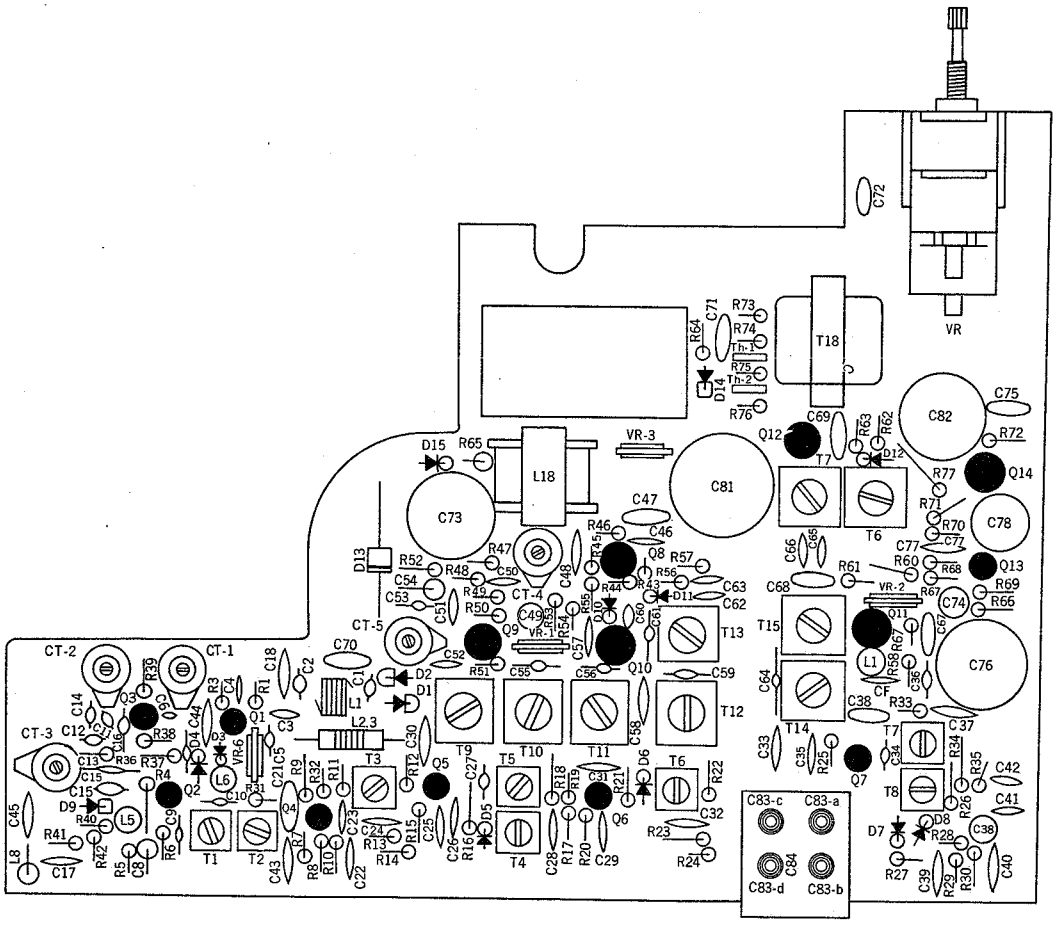
FM ALIGNMENT PROCEDURES

Check power supply voltage (13.2V).
Volume control should be set at maximum response.
Test signal from Signal Gererator: Modulation frequency 400 Hz
Frequency deviation 22.5 KHz
Signal level just high enough to provide meter deflection.

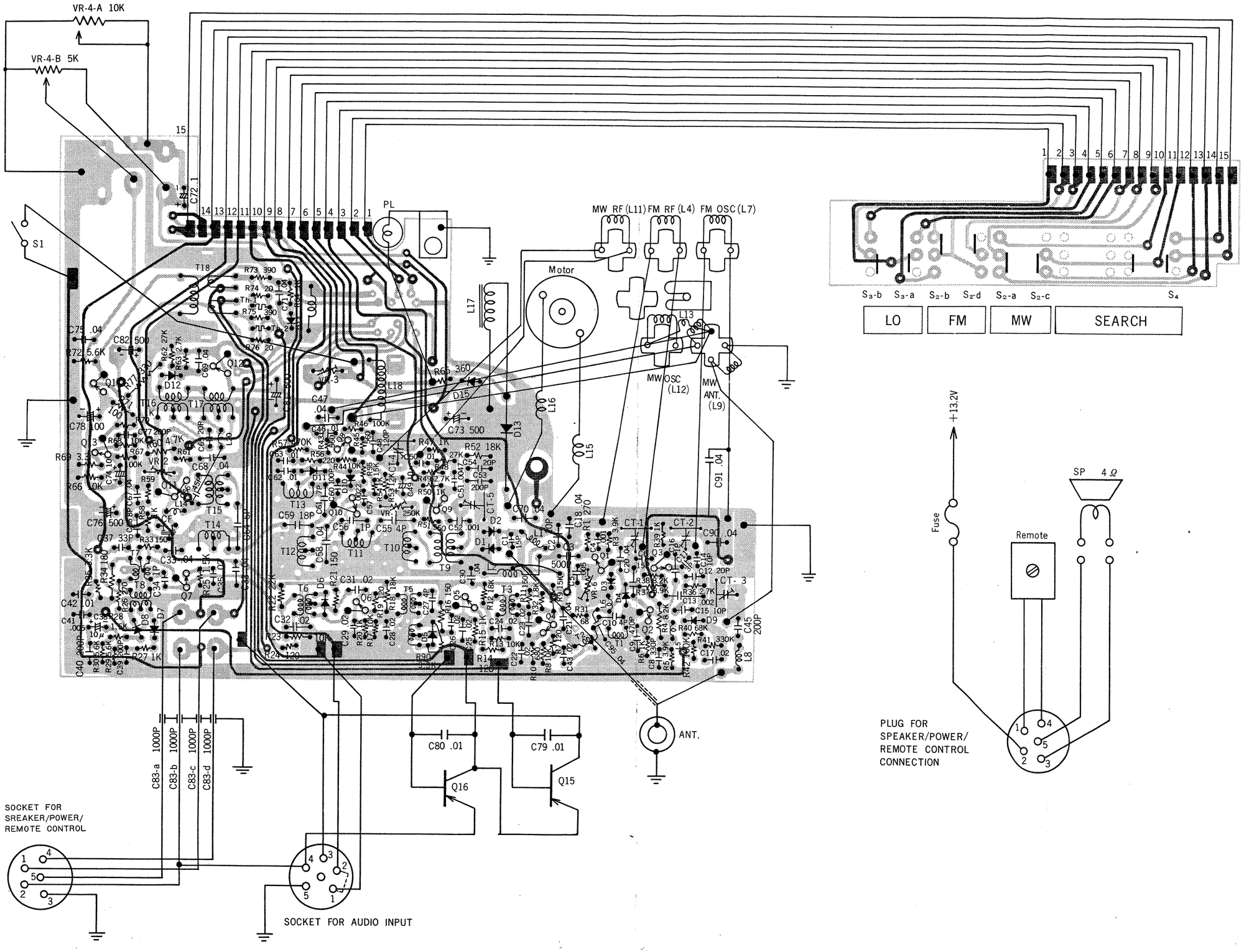
Signal supply inlet: Antenna receptacle through the dummy antenna.
Output meter connection: Through extension outlet unless otherwise noted.

STEP	GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECTION	ELEMENTS TO BE ADJUSTED	REMARKS
FM IF ALIGNMENT (with sweep marker generator)					
7.	10.7 MHz	Point of no interference	Connect output terminal to antenna. Input terminal to Tp-1 and Tp-3.	T1, T2, T3, T4, T5, T6 thru T7.	Adjust for maximum gain and most symmetrical response curve as shown in Fig. 7.
8.	10.7 MHz	Point of no interference.	Connect output terminal to antenna. Input terminal to Tp-2 and Tp-3.	T8.	Adjust for most symmetrical crossover curves and maximum linearity as shown in Fig. 8.
FM RF ALIGNMENT					
9.	87 MHz	Low frequency end stop.	To antenna thru the dummy antenna.	CT-2	Adjust for maximum.
10.	98 MHz	Tune to 98 MHz signal	To antenna thru the dummy antenna.	CT-1	Adjust for maximum.
TRIGGER ALIGNMENT					
11.	98 MHz	Tune to 98 MHz signal	To antenna thru the dummy antenna.	T16	Shortcircuit a switch between R61 and VR-3. Adjust for minimum current. See Fig. 5 for meter connection.
RELAY					
12.	98 MHz 15 dB	Tune to 98 MHz signal	To antenna thru the dummy antenna.	VR-3	Adjust for 5 mA current thru relay.

CIRCUIT BOARD DIAGRAM (Top View)



CIRCUIT BOARD DIAGRAM (Bottom View)



PARTS LIST

PARTS NO.	DESCRIPTION	Q'ty
(ELECTRIC)		
R-S87541	AT-71, Tuner Mechanism	1
R-S87546	Fix metal assembly	1
R-S87547	Fix metal assembly	1
R-117969	Fix metal	1
R-247156	Bearing	1
R-247157a	Shaft	1
R-247158	Shaft	1
R-157084	Shaft	1
R-157072	Shaft	1
R-S87548	Gear assembly	1
R-157068	Shaft	1
R-127063	Washer	1
R-247159	Sleeve	1
R-117981	Gear	1
R-117976	Washer	1
R-247165	Gear	1
R-S5744	Motor assembly	1
R-S87515	Planetary carrier assembly	1
R-397401	Planetary carrier	1
R-397400	Gear "C"	1
R-397399	Gear "B"	1
R-397398	Gear "A"	1
R-397403	Gear "E"	1
R-397402	Gear "D"	1
R-S87534	Gear assembly	1
R-S87550	Movement assembly	1
R-117965	Movement	1
	Round head rivet (10x1.5)	1
R-157073	Coil spring	1
R-127062	Leaf spring	1
R-S87537	Coil assembly	1
R-357089	Tube	1
R-S87532	Tuner assembly	1
M3x4	Pan head screw	1
M2.6x4	Pan head screw	1
M3x4	Countersunk head screw	2
M2.6x4	Pan head screw	1
M3x5	Countersunk screw	2

SCHEMATIC LOCATION	PART NO.	DESCRIPTION
(CONTROLS)		
L4, 7, 9,	R-S87541	Tuner Mechanism, Auto Search
CT1, 2	R-C0710	Trimmer Capacitor
CT3	R-C0711	Trimmer Capacitor
CT4, 5	R-C0702a	Trimmer Capacitor
VR1	R-R11018	Mini-pot, 250K, Q8 Bias Control
VR2	R-R11012	Mini-pot, 5K MW Trigger Adjust
VR3	R-R11013	Mini-pot, 5K, FM Trigger Adjust
VR4	R-R124742	Potentiometer, 10K + 5K, Volume/Tone
VR5	R-R11016	Mini-pot, 20K, Q1 Bias Control
S2	R-S4801	Push Button Switch, Search-MW-FM-LO
	R-S4800	Relay, OMRON DC 12V

SCHEMATIC LOCATION	PART NO.	DESCRIPTION	Q'ty
(CABINET)			
	R-127058	Metal Lid, Top & Bottom	2
	R-127057	Front Metal	1
	R-127056	Side Metal, Right-hand	1
	R-127056L	Side Metal, Left-hand	1
	R-267526	Heat Sink, Rear Metal	1
	R-111401	Lead Clamp, Antenna Lead	1
	R-A397317	Trim Plate, Front Plastic Assembly	1
	R-397317	Trim Plate only	(1)
	R-267530	Printed Metal	(1)
	R-437060	Black Sheet, Push-button Opening	(1)
	R-397315	Knob, Tone/Tuning Control	2
	R-367050	Knob, Volume/Tuning Control	2
	R-A397430	Push Button, SEARCH	1
	R-397430	Push Button	(1)
	R-267531	Marking, SEARCH	(1)
	R-A267533	Push Button, MW	1
	R-397429	Push Button	(1)
	R-267533	Marking, MW	(1)
	R-A267532	Push Button, FM	1
	R-397429	Push Button	(1)
	R-267532	Marking, FM	(1)
	R-A267534	Push Button, LO	1
	R-397429	Push Button	(1)
	R-267534	Marking, LO	(1)
	R-387117	Dial Scale	1
	R-267547	Back Ground, Dial Scale	1
	R-S87544	Drum Assembly, Tuning Indicator	1
	R-S87529	Shaft Tuning,	1
	R-217026a	Spring, Link between Tuner and Shaft	1
	R-157038b	Special Screw, Heat Sink	1
	R-357066	Plastic Cap, DIN Socket	1
	R-111447	Washer, Control Shaft mtg.	2
	R-24950	Hex. Nut, Control Shaft mtg.	2
	R-267456	Washer, Control Shaft Spacing Adjust	2
		Dial Cord, 0.3mm dia., 100mm long	1
	R-417367	Printed Circuit Board, Push Switch mtg.	1
(MISCELLANEOUS)			
	R-S0785	Speaker, 5" 4 ohms	
	R-S1815	Ceramic Filter, FM IF	
	R-S1286-2	Power Supply Cord & Fuse Holder	
	R-S1044	Fuse, 1.2A, Quick-act	
	R-S2155	Antenna Lead & Socket	
	R-S3138a	Speaker Lead (Female), unit side	
	R-S3139b	Speaker Lead (Male), speaker side	
	R-S3739-1	Lead & Socket, Remote Control	
	R-S2732	Socket, 5P, Power Supply/Speaker Lead	
	R-S1738	Plug, 5P, Power Supply/Speaker Lead	
	R-S2764	Socket, DIN Input	
	R-367019	Insulation Cap, 5P Plug	
	R-S1748	Pilot Lamp	
	R-S2763	Plug, 2P, DIN Socket Shortcircuit	
	R-23204L	Lug Terminal, Output Transistor	

PARTS LIST

SCHEMATIC LOCATION	PARTS NO.	DESCRIPTION
(COILS & TRANSFORMERS)		
L1	R-W9517	VHF Coil
L2	R-W2228	Antenna Coil, FM
L5, 6, 14	R-W1713	VHF Coil
L8	R-W1015e	Choke Coil, FM Trap
L13, 20	R-W1064	Choke Coil
L15, 16	R-W1029	Choke Coil, Motor Noise Filter
L17	R-S87537	Plunger, Tuner Mechanism
L18	R-W6705	Choke Coil, Line Filter
T1	R-W5T733	IF Transformer, Prim. of FM 1st stage
T2	R-W5T734	IF Transformer, Sec. of FM 1st stage
T3, 6	R-W5T308	IF Transformer, FM 2nd/4th stage
T4	R-W5T735	IF Transformer, Prim. of FM 3rd stage
T5	R-W5T736	IF Transformer, Sec. of FM 3rd stage
T7	R-W5T309	IF Transformer, Prim. of FM 5th stage
T8	R-W5T310	IF Transformer, Sec. of FM 5th stage
T9	R-W8210	Coil, MW Oscillator
T10	R-W5T218	IF Transformer, Prim. of MW 1st stage
T11	R-W5T219	IF Transformer, Sec. of MW 1st stage
T12	R-W5T220	IF Transformer, Prim. of MW 2nd stage
T13	R-W5T221	IF Transformer, Sec. of MW 2nd stage
T14	R-W5T137	IF Transformer, MW Trigger Stage
T15	R-W5T136	IF Transformer, FM Trigger Stage
T16	R-W5T746	IF Transformer, FM Trigger Stage
T17	R-W5T135	IF Transformer, MW Trigger Stage
T18	R-W6339	Transformer, Audio Driver

(RESISTORS)				
R1, 26	R-R271K	270	ohms	±10% ¼W
R3, 5, 37	R-R392K	3.9K	ohms	±10% ¼W
R4, 38	R-R822K	8.2K	ohms	±10% ¼W
R6, 15, 20, 27 39, 47, 50, 54, 58, 61, 64, 70	R-R102K	1K	ohms	±10% ¼W
R7, 14, 19	R-R121K	120	ohms	±10% ¼W
R8, 13, 17, 23, 44, 66, 68	R-R103K	10K	ohms	±10% ¼W
R9, 55	R-R153K	15K	ohms	±10% ¼W
R10	R-R681K	680	ohms	±10% ¼W
R11, 16, 21, 33	R-R151K	150	ohms	±10% ¼W
R12, 18, 52, 59	R-R183K	18K	ohms	±10% ¼W
R22	R-R223K	22K	ohms	±10% ¼W
R24, 77	R-R331K	330	ohms	±10% ¼W
R25, 28	R-R152K	1.5K	ohms	±10% ¼W
R29, 30, 72	R-R562K	5.6K	ohms	±10% ¼W
R31	R-R680K	68	ohms	±10% ¼W
R32	R-R182K	1.8K	ohms	±10% ¼W
R34	R-R181K	180	ohms	±10% ¼W
R35	R-R332K	3.3K	ohms	±10% ¼W
R36, 49, 63	R-R272K	2.7K	ohms	±10% ¼W
R40	R-R683K	68K	ohms	±10% ¼W
R41	R-R334K	330K	ohms	±10% ¼W
R42, 46, 67	R-R104K	100K	ohms	±10% ¼W
R43, 45, 51	R-R561K	560	ohms	±10% ¼W
R48, 62	R-R273K	27K	ohms	±10% ¼W
R53	R-R123K	12K	ohms	±10% ¼W
R56	R-R221K	220	ohms	±10% ¼W
R57	R-R474K	470	ohms	±10% ¼W
R60	R-R472K	4.7K	ohms	±10% ¼W
R65	R-R361K	360	ohms	±10% ¼W
R69	R-R3N3K	3.3	ohms	±10% ¼W
R71	R-R101K	100	ohms	±10% ¼W
R73, 75	R-R391J	390	ohms	±5% ¼W
R74, 76	R-R200J	20	ohms	±5% ¼W

SCHEMATIC LOCATION	PART NO.	DESCRIPTION
(SEMICONDUCTORS)		
Q1, 2	2SC668	Transistor
Q3, 4, 5, 6, 7	2SC930	Transistor
Q8, 10	2SA322	Transistor
Q9	2SA329	Transistor
Q11	2SA324	Transistor
Q12	2SB405R	Transistor
Q13	2SC537	Transistor
Q14	2SB186	Transistor
Q15, 16	2SB474x2	Transistor
D1, 2	MC-2	Diode
D3	1S153	Diode
D4, 5, 6	1S187s	Diode
D7, 8	1S187s	Diode, a pair for FM Discrim.
D9	1S553	Diode, Silicon Vari-cap.
D10, 11, 12	1S188	Diode
D13	1S1665	Diode
D14	SM-150	Diode
D15	RD-6A	Diode
Th-1, 2	SDT-02	Thermistor

(CAPACITORS)				
C1	R-CKD150K	Ceramic	15 pF	±10% 50V
C2, 12, 54, 65	R-CKD200K	Ceramic	20 PF	±10% 50V
C3	R-CKD501M	Ceramic	500 pF	±20% 50V
C4	R-CKD102Z	Ceramic	0.001 mfd	+80% 50V
C5	R-CKD502Z	Ceramic	0.005 mfd	+80% 50V
C6	R-CKD150K	Ceramic	15 pF	±10% 50V
C7	R-CKD020K	Ceramic	2 pF	±10% 50V
C8	R-CKD331K	Ceramic	330 pF	±10% 150V
C9	R-CQT471K	Styrol	470 pF	±10% 150V
C10, 27, 55	R-CKD040K	Ceramic	4 pF	±10% 50V
C11	R-CKD030K	Ceramic	3 pF	±10% 50V
C13	R-CKD202Z	Ceramic	0.002 mfd	+80% 50V
C14, 15	R-CKD100K	Ceramic	10 pF	±10% 50V
C16, 34, 56	R-CKD010K	Ceramic	1 pF	±10% 50V
C17, 22, 23, 24 25, 26, 28, 29 31, 32, 35, 43	R-CKD203Z	Ceramic	0.02 mfd	+80% 50V
C18, 19, 21, 30 44, 58	R-CKD403Z	Ceramic	0.04 mfd	+80% 50V
C20, 33, 47, 67 68, 69, 70, 71 75, 90	R-CQS403Y	Mylar	0.04 mfd	+30% 50V
C36	R-CKD080K	Ceramic	8 pF	±10% 50V
C37	R-CKD330K	Ceramic	33 pF	±10% 50V
C38, 49, 74	R-C9060	Electrolytic	10 mfd	10V
C39, 40, 45, 77	R-CKD201K	Ceramic	200 pF	±10% 50V
C41	R-CQS502Y	Mylar	0.005 mfd	+30% 50V
C42, 46, 50, 62 63, 79, 80	R-CQS103Y	Mylar	0.01 mfd	+30% 50V
C48	R-CKD121K	Ceramic	120 pfd	±10% 50V
C51	R-CQS472Y	Mylar	0.0047 mfd	+30% 50V
C52	R-CQS102Y	Mylar	0.001 mfd	+30% 50V
C53	R-CQT201J	Styrol	200 pF	± 5% 150V
C57	R-CQS222Y	Mylar	0.0022 mfd	+30% 50V
C59	R-CKD180K	Ceramic	18 pF	±10% 50V
C60	R-CKD101K	Ceramic	100 pF	±10% 50V
C61	R-CKD070K	Ceramic	7 pF	±10% 50V
C64	R-CKD060K	Ceramic	6 pF	±10% 50V
C66	R-CKD450K	Ceramic	45 pF	±10% 50V
C72	R-C9126	Electrolytic	0.1 mfd	10V
C73, 76, 82	R-C9162	Electrolytic	500 mfd	10V
C78	R-C9145	Electrolytic	100 mfd	10V
C81	R-C9127a	Electrolytic	500 mfd	15V
C83	R-C7708	Feed-thru	100 pFx4	